Altitudinal Migration Within a Watershed Influences the Contaminant Profiles of American Dippers

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Abstract
From 1999-2002, an intensive study of a population of American dippers was established on the Chilliwack River, a coastal watershed of southwestern British Columbia, Canada. Over 500 American dippers were individually color banded and followed to identify patterns of seasonal movement and its potential influence on contaminant burdens. The study revealed that the majority (~85%) of the dipper population seasonally migrated from the low elevation river to the higher elevation creeks while the remaining birds (~15%) remained on the river year-round. Through residue analysis of egg contents and breast feathers, we were able to detect a trend in contaminant profiles of resident and migrant American dippers. Total chlorinated hydrocarbons, polychlorinated biphenyls, and mercury were significantly higher ($p < 0.0001$, $p < 0.005$, $p < 0.001$ respectively) in eggs from river residents compared to the creek migrants. The three most prevalent organochlorine compounds in dipper eggs, DDE, hexachlorobenzene, and trans-nonachlor, were all significantly higher on the river compared to those from the creeks. Additionally, feather mercury ($p = 0.068$) and feather cadmium ($p = 0.02$), but not feather lead ($p > 0.7$), showed higher mean concentrations in the river residents. These results emphasize the importance of understanding the ecology of the species to be able to correctly assess toxicological effects at the population level.